

CLAIMS

What is claimed is:

1. A method of activating an antigen-presenting cell comprising the steps of:

transducing the antigen-presenting cell with an expression vector, wherein said expression vector comprises a polynucleotide promoter sequence, a polynucleotide sequence encoding a ligand-binding region and a polynucleotide sequence encoding CD40 molecule, all operatively linked; and

activating the transduced antigen-presenting cell by administering a ligand which binds to the ligand-binding region resulting in oligomerization.
2. The method of claim 1, wherein the CD40 molecule is a CD40 cytoplasmic domain.
3. The method of claim 2, wherein the expression vector further comprises a second polynucleotide sequence encoding a second ligand-binding region.
4. The method of claim 2 wherein the expression vector further comprises a polynucleotide sequence encoding a membrane-targeting sequence.
5. The method of claim 2, wherein the ligand is a non-protein.
6. A method of modulating an immune response in a subject comprising the step of:

administering an expression vector, wherein said expression vector is expressed in dendritic cells and said vector comprises a polynucleotide promoter sequence, a polynucleotide sequence encoding a ligand-binding region, and a polynucleotide sequence encoding a co-stimulatory polypeptide, all operatively linked.
7. The method of claim 6, wherein the expression vector further comprises a second polynucleotide sequence encoding a second ligand-binding region.
8. The method of claim 6, wherein the expression vector further comprises a polynucleotide sequence encoding a membrane-targeting sequence.

9. The method of claim 6, wherein a ligand is administered to the subject to result in oligomerization.
10. The method of claim 6, wherein the ligand is a non-protein.
11. The method of claim 6, wherein the subject is immunocompromised.
12. The method of claim 11, wherein the immunocompromised subject is infected with HIV.
13. A method of modulating an immune response in a subject comprising the steps of:

transducing an antigen-presenting cell with an expression vector, wherein said expression vector comprises a polynucleotide promoter sequence, a polynucleotide sequence encoding a ligand-binding region, and a polynucleotide sequence encoding a co-stimulatory polypeptide, all operatively linked, all operatively linked; and

administering the transduced antigen-presenting cell the subject to enhance the immune response in the subject.
14. The method of claim 13, wherein the transduced antigen present cells are administered to the subject simultaneously or subsequently to the administration of an immunogenic composition.
15. The method of claim 13, wherein the transduced antigen-presenting cell is activated by administering a ligand resulting in oligomerization.
16. The method of claim 13, wherein the transduced antigen-presenting cells are loaded with an antigen.
17. The method of claim 16, wherein the antigen is a tumor antigen.
18. The method of claim 16, wherein loading comprises pulsing said cell with acid-eluted peptides or cell lysates.
19. The method of claim 16, wherein loading comprises electrofusing said cell with antigens or cell lysates.

20. The method of claim 16, wherein loading comprises transfecting said cell with mRNA of an antigen.
21. The method of claim 13, wherein the co-stimulatory polypeptide is a CD40 cytoplasmic domain.
22. The method of claim 16, wherein said transduced, loaded antigen-presenting cells are administered to said subject intradermally or subcutaneously.
23. The method of claim 13, wherein said antigen-presenting cells are transduced with the expression vector *in vitro* prior to administering to said animal.
24. A composition for activating an antigen-presenting cell comprising an expression vector having a polynucleotide promoter sequence, a polynucleotide sequence encoding a ligand-binding region and a polynucleotide sequence encoding CD40 molecule, all operatively linked.